



REMARKS

Applicants affirm the election of Claims 10 - 15 which have been amended in this response. The inventorship entity remains the same as presently constituted. Applicants have also amended the specification to correct the informalities noted by the Examiner in the Official Action as well as other corrections needed as determined by Applicants in their review of the specification.

Applicants have amended the specification to explain that the expression "organic base" refers to "a compound having basic (alkaline) properties." The basis for this insertion is the compounds which are represented within the scope of the compounds are all organic compounds having alkaline properties. The formula in Claim 12 has been amended to state that the "R" is a methyl group. The support for this amendment is found in the specification on pages 11 and 12 where the specific compounds named contain methyl substituents on the glycoluril.

Applicants will provide formal drawings upon Notice of Allowance of the claims.

In view of the amendments thereto, these claims should be allowable. Such action is respectfully requested

Respectfully Submitted,

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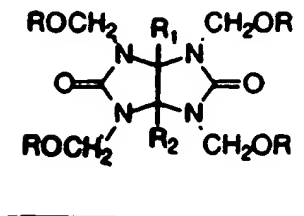
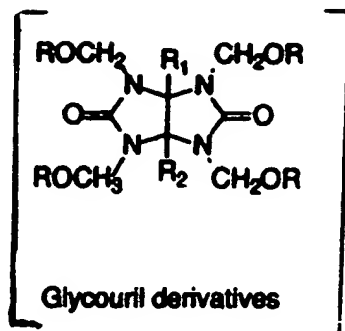
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APPENDIX B
VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

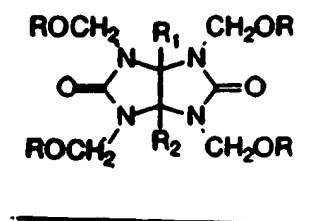
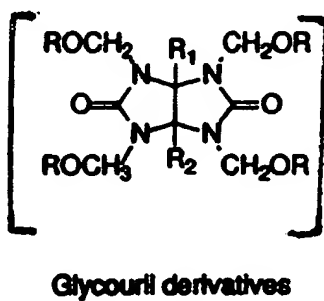
REWRITE PAGES 11 THROUGH 16 OF THE SPECIFICATION:

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Crosslinkers for the compositions of this invention are Glycoluril derivatives of general formula:



in which R is [a alkoxy, preferably CH₂OCH₃] -CH₃, and [R1 and R2] R₁ and R₂ can individually be selected from alkyl groups having 1 -6 carbon atoms exemplified by
(a) tetrakis-methoxymethyl-[3a,6a]3α,6α-diethylglycouril,

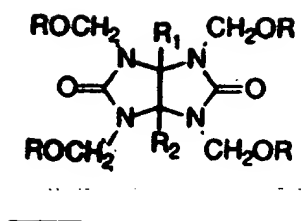
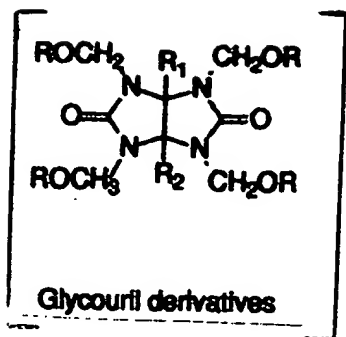


(b) tetrakis-methoxymethyl- 3[a] α-methyl-6[a] α -propylglycoluril and

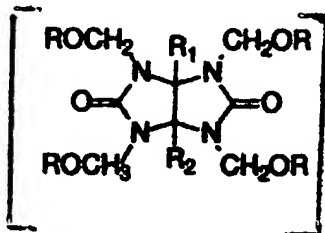
(c) tetrakis-methoxymethyl- 3[a] α-methyl-6[a] α-butylglycoluril as shown in the following formula:

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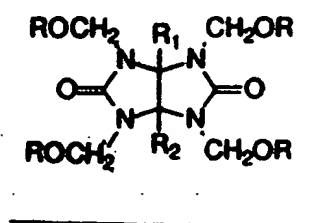
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R¹ and R² can also be selected from alkyl and aryl group or hydrogen and aryl groups like (d) tetrakis-methoxymethyl-3[a] α -phenylglycouril and (e) tetrakis-methoxymethyl-3[a] α -methyl-6[a] α -phenylglycoluril as shown in the following formula:



Glycouril derivatives



The composition of the present invention also preferably includes a photoacid generator (PAG) which can be selected from onium [slats] salts of Group IV elements as disclosed in U.S. Patent No, 4,175,972 the teaching of which is incorporated herein by reference and aromatic onium salts of Group Va elements disclosed in U.S. Patent No. 4,069,055

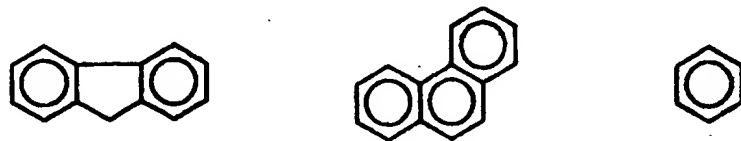
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the teaching of which is incorporated herein by reference. Aromatic Group IVa onium salts include those represented by formula:



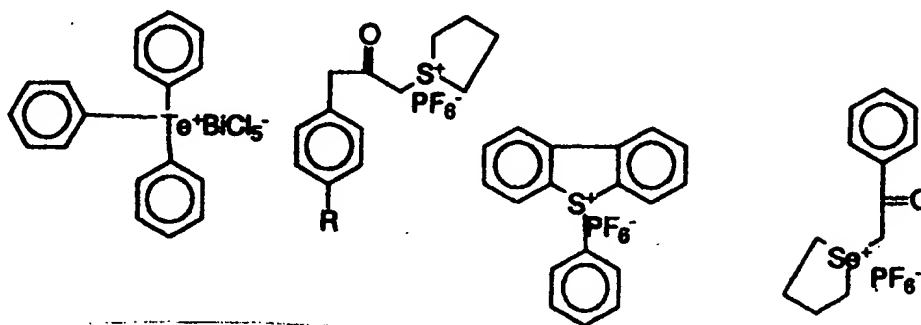
where R is a monovalent aromatic organic radical, R¹ is a monovalent organic aliphatic radical selected from alkyl, cycloalkyl and substituted alkyl, R² is a polyvalent organic radical forming a heterocyclic or fused ring structure[.]; x is a Group IVa element or metalloid, Q is a halogen radical, a is a whole number from 0 to 3 inclusive, b is a whole number from 0 to 2 inclusive and c is a whole number equal to 0 or 1. Radicals included by R are, for example, (C₆ - C₁₄) aromatic hydrocarbon radicals such as phenyl, tolyl, xylyl, naphthyl, anthryl and radicals substituted with up to 1 to 4 monovalent radicals, such as C(1-8) alkyl, C(1-8) alkoxy, nitro, [chloror] chloro, fluoro, and hydroxy; arylacyl radicals such as phenylacetyl; aromatic heterocyclic radicals such as pyridyl and furyl; R¹ radicals include C(1-8) alkyl, substituted alkyl such as -C₂H₄OCH₃, -CH₂-COCH₃, etc.; R² radicals include structures such as:



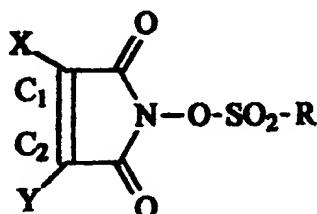
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Complex anions included by $MQe^{(-)}$ of above formula are, for example $[.]_2BF_4^-$, PF_6^- , SbF_6^- , $FeCl_4^-$, $SnCl_6^-$, $SbCl_6^-$, $BiCl_6^-$, AlF_6^{3-} , $GaCl_4^-$, InF_4^- , etc. Group Via onium salts included by above formula are, for example:



Among non-metallic radiation degradable acid generators suitable for use in compositions of this invention are N-sulfonyloxyimides of the form:



where R is selected from the group consisting of toluene, benzene, CF_3 , CF_2CF_3 , $-(CF_2)_n-Z$ where $n = 1$ to 4 and Z is H or alkyl or aryl and where X and Y either (1) form polycyclic ring which may or may not contain heteroatoms, or (2) form a fused aromatic

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ring or (3) may be independently H, alkyl or aryl group and C₁ and C₂ may form a single or double bond. The compositions of the present invention are preferably carried in a solvent or solvent system. The solvent or solvent system used in carrying these compositions preferably fulfills the need for providing uniform coating with complete coverage of the resist components on the substrate. The solvent preferably evaporates at temperature such that the photoactivity of the resist is not adversely impacted upon a drying step and will not take part in the operation of the photoresist (to be inert toward the phenolic resin and/or crosslinker). Typical of these solvents are propyleneglycol monomethyl ether acetate {PGMEA}, ethyl-3-ethoxypropionate {EEP}, methoxypropanol, ethoxypropanol , butoxypropanol and ethyl lactate.

For formation of the negative tone image, the composition of the present invention is applied (for example, by spin-coating) on a substrate and the remaining solvent is evaporated by heating the substrate on a hot plate to temperatures of about 70-130° C for 1 -3 minutes. The film is then imagewise exposed to [Ebeam] E beam radiation at 100 kV. 200-370 nm upon which the radiation degradable component of the composition degrades and forms catalytic amount of acid. The crosslinking reaction between aliphatic hydroxyl calixarene dendrimer shown above and crosslinker is then accelerated by heating the substrate from [70-120 C] 70-120° C for preferably one to three minutes. The images are thus rendered less soluble or insoluble in organic solvent. Typical of these solvents are propyleneglycol monomethyl ether acetate {PGMEA}, ethyl-3-ethoxypropionate (EEP), methoxypropanol, ethoxypropanol , butoxypropanol

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and ethyl lactate, and in the developing stage, the unexposed areas are removed by these solvents.

In another embodiment of this invention, the glycoluril derivatives which are used as crosslinkers are synthesized from corresponding dicarbonyl compounds as described.

Glycoluril derivatives of this invention are highly soluble in the organic solvent of [the] choice, and compared [to] with unsubstituted glycoluril. For purposes of explication of the present invention, the terms "glycouril" and "glycoluril" connote the identical compound. The expression "organic base" represents a compound having basic (alkaline) properties.

General procedure for preparation of alkyl-substituted [Gvcolurils] Glycourils

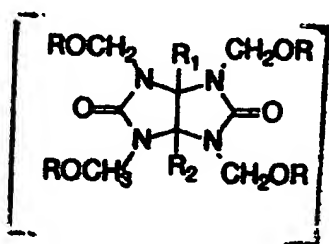
Synthesis of alkyl-substituted glycolurils is exemplified by the synthesis of [3a-methyl-6a-propylglvcoluril] 3 α -methyl-6 α -propylglvcoluril described below.

2,3-hexandione (1.0 mole) and urea (3.0 mole) were added to 2.0 liters of 2% hydrochloric acid and the solution is stirred at room temperature for 24 hours (alternatively, the solution could be refluxed for 2-3 hours). The precipitate is filtered and washed with water and then ethanol and [dired] dried. The off-white powder is then crystallized in acetic acid to give analytically pure tite compound in 45% yield.

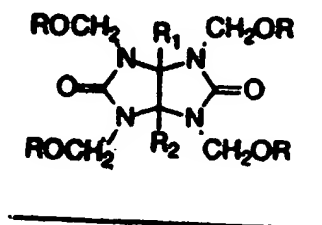
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REWRITE THE FOLLOWING CLAIMS:

- 10. (Amended) A composition of matter comprising: an admixture of [a] an aliphatic hydroxyl containing dendrimer with at least 8 hydroxyl groups per molecule; a glycoluril derivative; a photoacid generator; an organic solvent; and an organic base.
- 11. (Amended) A composition according to claim [13]10 wherein said [phenolic resin is an] aliphatic hydroxyl containing dendrimer with at least 8 hydroxyl groups per molecule is a phenolic resin.
- 12. (Amended) A composition according to claim [13]11 wherein said glycoluril derivative has the general formula:



Glycoluril derivatives



in which R is -CH₃, R₁ and R₂ can be selected individually from the group consisting of [alkyls] alkyls having 1-6 carbons, alkenyls, and alkoxys.

- 13. (Amended) A composition according to claim [13]11 wherein said photoacid generator is selected from onium salts of Group IV elements.
- 14. (Amended) A composition according to claim [13]11 wherein said photoacid generator is selected from [onium] onium salts of Group VIa elements.

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-- 15. (Amended) A composition according to claim [13] 11 wherein said phenolic resin, said glycoluril derivative, said photoacid generator and said solvent form an admixture comprising from about 40% to about 80% of said [dendrimer] phenolic resin [or polymer] from about 5% to about 25% of said glycoluril derivative and from about 2.0% to about 20% of said photoacid generator.

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